Space Weather Forecast

Issued on Friday, 05 May 2023 at 01:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: R1-R2 blackouts expected throughout with a slight chance of R3 Strong radio blackouts. Minor-Moderate Storm conditions expected 7th and 8th May.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with a Moderate class flare from AR3296, although this region is not the largest or the most magnetically complex on the visible disc. In total there are eight number regions on the visible disc, with AR3293 the most magnetically complex, and AR3297 the largest region. The remaining five regions all relatively small, weak and magnetically simple.

Numerous CME's (Coronal Mass Ejections) have departed from the Sun over the past 24 hours. Most of these appear far-sided. However, a full halo CME appears to be associated with the Moderate class flare, and therefore has an Earth directed component. Further analysis will be undertaken to determine if any of the other CME's leaving the Sun have Earth directed components.

Solar Wind / Geomagnetic Activity: The solar wind observed persisted at predominantly slightly elevated levels, peaking at 451 km/s at 04/0414 UTC. The strength of the solar wind's magnetic field strength remained weak., with the important north-south component of the magnetic field also weak, and generally negative. Geomagnetic activity was Quiet throughout.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity is expected with Moderate class flares, and a slight chance of Strong flares. Significant flares are most likely from AR3293, AR3296 and AR3297 in the northeast. New regions may rotate onto the visible disc from the far side during the forecast period, potentially adding to the chance of significant flares.

Solar Wind / Geomagnetic Activity: At present a CME, associated with the M3.9 flare on the 4th, is expected to arrive at Earth either late on day 3 (7th) or early on day 4 (8th). A connection to an enhanced solar wind from a large coronal hole in the southern hemisphere is likely either later today or early tomorrow (5th or 6th), followed by a connection to a weaker solar wind enhancement from a small northern hemisphere coronal hole 01 on 06 May. Speeds are uncertain, but the combination of high speed streams could reach speeds of 450-500km/s. Geomagnetic activity is expected to be predominantly Quiet today increasing Unsettled to Active from late tomorrow (6th), or early on the 7th, with Minor-Moderate Storm intervals likely late day 3 (7th) or early day 4 (8th) due to the expected CME arrival.

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Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to persist at background levels with no solar radiation storms occurring. However count rates may increase with any notable flares that occur, with a slight chance of reaching the S1 Minor Radiation Storm threshold throughout, mainly from the complex regions in the northeast quadrant.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	10	30	70	60
Strong	G3	No	1	1	20	10
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	15	15	15	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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